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NEW JERSEY'S INSECTS

BY HARRY B. WEISS

NEW JERSEY AGRICULTURAL EXPERIMENT STATION

INASMUCH as the number of species of insects inhabiting the earth is far greater than that of all other animals grouped together, it is hardly necessary to state that New Jersey's 10,530 species should not be taken as an indication that this state is an undesirable place in which to live. Other states have just as many, if not more. As the presence or absence of insects within the borders of a community or state may be responsible for the difference between sickness and health, irritation and comfort and poverty and wealth, the following questions naturally arise when such a large number of species is considered. Are all of them injurious? If not, of what use are the others? Are any of them beneficial and so on.

The following tables compiled chiefly from Smith's "List of the Insects of New Jersey" and other papers dealing with the insect fauna of that state will serve to answer these questions. Ten thousand, five hundred and thirty is the number of species which has been recorded up to the present time. Many others, principally in certain obscure groups, remain to be found, but, on the whole, New Jersey has been rather well collected over and the above number is fairly representative. The eight divisions used are those in which the species naturally fall. It would be possible of course to have a larger number of groups, but for a clear and quick understanding, a few only are desirable. Those insects whose habits vary considerably in the different stages have been placed according to their predominating mode of life.

The first group includes those of little or no economic importance, such as species of the *Corrodentia* which feed principally on lichens and moss, and the aquatic forms found in the *Plecoptera*, *Ephemerida* and *Trichoptera*. The second includes various species which infest stored products, food and otherwise, and those commonly known as household pests. The scavenger and third group embraces the feeders upon the products of decay, dead or dry animal and vegetable matter, and those which change or remove the form of animal and vegetable remains and aid in reducing such substances into shape for assimilation by plants. The fourth division consists of those which annoy, irritate or transmit diseases to vertebrates, while the fifth takes in all which are predaceous upon other insects. Those which feed upon liv-

ing plant tissue, many of which are of direct interest to the agriculturist, will be found in the sixth group, the insect parasites in the seventh and the beneficial plant feeders or pollenizers in the eighth. It would be possible of course to include in the eighth group, certain members of the Diptera, Coleoptera and Lepidoptera which as adults serve a useful purpose as pollenizers, but, on the whole, such species have other predominating larval habits which overshadow the beneficial ones of the adults.

Table I. shows how the different orders are represented in each group.

TABLE I

Order	1 Of No Eco- nomic Importance	2 Injur. to Stored Prod- ucts	3 Scav- engers	4 Injuri- ous to Verte- brates	5 Preda- tory	6 Injuri- ous to Vege- tation	7 Parasitic upon Insects	8 Benefe- cial Plant Feeders	Total No. Species
Thysanura.....		3	38						41
Ephemera.....	29								29
Plecoptera.....	25								25
Mallophaga.....				101					101
Isoptera.....			1						1
Corrodentia.....	36	2							38
Platyptera.....	9								9
Neuroptera.....					44				44
Mecoptera.....					11				11
Trichoptera.....	60								60
Odonata.....					121				121
Thysanoptera.....						14			14
Parasitica.....				13					13
Homoptera.....						507			507
Heteroptera.....				2	142	269			413
Dermoptera.....	5								5
Orthoptera.....		3			9	140			152
Lepidoptera.....		4	25			2,091			2,120
Coleoptera.....		44	1,161		696	1,207			3,108
Siphonaptera.....				4					4
Hymenoptera.....		2	118		302	362	1,012	211	2,007
Diptera.....			475	133	357	485	257		1,707
Totals.....	164	58	1,818	253	1,682	5,075	1,269	211	10,530

TABLE II

	Per Cent.
Insects of no economic importance	1.55
Insects injurious to stored products	0.55
Insect scavengers	17.26
Insects injurious to vertebrates	2.40
Predatory insects	15.97
Insects injurious to vegetation	48.19
Insect parasites	12.05
Beneficial plant feeders	2.00

Table II. indicates the percentages of the different groups. Thus 17.26 per cent. of all the species found in New Jersey can be classed

as scavengers, these being found principally in the orders Coleoptera and Diptera. Belonging chiefly to the Mallophaga and Diptera, we have only 2.40 per cent. which are injurious to vertebrates, among which however are species closely associated with man and disease. In the Coleoptera, Hymenoptera and Diptera are found most of the predatory forms, amounting to 15.97 per cent. These, of course, are engaged in feeding upon and destroying those of their kind and others which might be more or less beneficial. The largest percentage, 48.19, consists of insects which injure vegetation and is made up chiefly of species from the Lepidoptera, Coleoptera and Homoptera although some of the other orders are fairly well represented. In the parasitic group, the 12.05 per cent. is found solely in the Hymenoptera and Diptera. Classing the scavengers, the pollenizers, the predatory and the parasitic forms together, we have a total of 47.28 per cent., a number which almost equals the percentage of injurious ones. Thus it is seen that almost one half of the species of insects which we have in our midst are engaged in useful activities.

Considering the injurious ones from another viewpoint, namely, that of destructiveness, it is surprising how small a proportion is destructive enough to warrant the application of insecticides or remedial measures. The following table (III) gives the total number of species in the seven most important orders and the number and percentage of destructive ones. It must be remembered, of course, that there are numerous other species classed as injurious, but these do not occur in sufficient numbers to make their presence felt or they confine their attentions to unimportant plants and are therefore not included in the list.

TABLE III

Order	Total No. Species	No. of Destructive Species	Percentage of Destructive Species
Coleoptera	3,108	50	1.60
Lepidoptera.....	2,120	58	2.73
Hymenoptera.....	2,007	9	0.44
Diptera.....	1,707	28	1.64
Heteroptera.....	413	8	1.93
Homoptera.....	507	28	5.52
Orthoptera.....	152	5	3.28

Of the entire number of species listed from New Jersey, 10,530, which includes all orders, only 1.76 per cent. is really destructive. Of the entire number in the seven orders in Table III., only 1.85 per cent. is destructive. As to the individual orders, the Homoptera have the largest percentage and the Hymenoptera the smallest, which is not strange considering the fact that all of the members of the Homoptera are plant feeders, while the Hymenoptera consist of both beneficial

and injurious forms, with the former largely in the majority. The Orthoptera with its 3.28 per cent. of destructive species contain a large majority which feed upon vegetation. While most Lepidopterous larvæ feed upon vegetation, yet the fact that many confine their activities to plants not under cultivation by man or occur in small numbers, brings the percentage down to 2.73. The Heteroptera are plant feeders with numerous exceptions; predatory and injurious insects are abundant in the Coleoptera and the Diptera contain predaceous and beneficial species as well as feeders on animal and vegetable tissue. In these three orders, the percentages of destructive species are similar.

Therefore, the insect losses in the state of New Jersey are due entirely to the activities at different times of only 186 species, some of which are and any one of which may become notably abundant.